

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
<p>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p><b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b></p>					
1. REPORT DATE (DD-MM-YYYY) 23 March 2013		2. REPORT TYPE Conference Proceedings		3. DATES COVERED (From – To) 17 April 2012 – 17 July 2012	
4. TITLE AND SUBTITLE  3rd International Conference on Metamaterials, Photonic crystals and Plasmonics			5a. CONTRACT NUMBER  W911NF-12-1-0177		
			5b. GRANT NUMBER  CSP 12-2086		
			5c. PROGRAM ELEMENT NUMBER  61102F		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5d. TASK NUMBER		
			5e. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Zouhdi Said Plateau De Moulon Gif Sur Yvette, France 91192			8. PERFORMING ORGANIZATION REPORT NUMBER  N/A		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  EOARD Unit 4515 BOX 14 APO AE 09421			10. SPONSOR/MONITOR'S ACRONYM(S)  AFRL/AFOSR/IOE (EOARD)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)  AFRL-AFOSR-UK-PC-2013-0004		
12. DISTRIBUTION/AVAILABILITY STATEMENT  Distribution A: Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT These sessions practically covered all modern aspects of metamaterials and plasmonic materials such as: <ul style="list-style-type: none"> <li>• bottom-up manufacturing methods</li> <li>• plasmonics structures and antennas for biomedical applications</li> <li>• negative group delay (NGD) concept and applications</li> <li>• active and quantum metamaterials</li> <li>• mid-infrared and THz plasmonics</li> <li>• acoustic metamaterials</li> <li>• light absorptions or photothermal effects in the field of plasmonics and metamaterials</li> <li>• energy transportation in metamaterials</li> </ul> In summary, META'12, the 3rd International Conference on Metamaterials, Photonic crystals and Plasmonics was an outstanding and very informative conference, with broad coverage of diverse activities in Metamaterials, plasmonics and PCs science and engineering developments by international researchers. The full-version of the conference papers will be reviewed to be included in special issues of the journals Applied Physics A ( <i>Springer</i> ) and Advanced Electromagnetics.					
15. SUBJECT TERMS  EOARD, Malware, Intrusion Detection, Malware Containment, Malware Detection					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT  SAR	18. NUMBER OF PAGES  5	19a. NAME OF RESPONSIBLE PERSON John Gonglewski
a. REPORT UNCLAS	b. ABSTRACT UNCLAS	c. THIS PAGE UNCLAS			19b. TELEPHONE NUMBER (Include area code) +44 (0)1895 616007

# General Report



## META'12

**3rd International Conference on Metamaterials, Photonic crystals and Plasmonics**

*By Said Zouhdi, conference general chair*

**Paris – France**

**April 19 - 22, 2012**

## Background

From 19 to 22 April, some **545 scientists**, experts and engineers from **46 countries** gathered in Paris, at the conference META'12 to examine how newly synthesized materials can benefit environmental sensing and information security, both in the civilian and military areas.

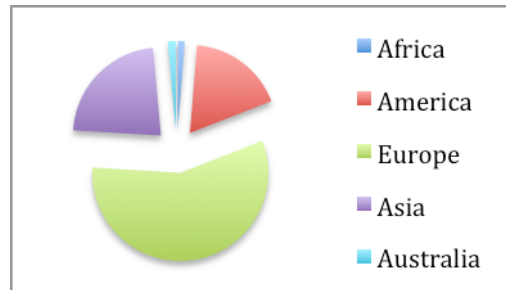


Fig. 1: Geographical distribution of META'12 participants

Participants in the workshop focused on the unusual characteristics and potential applications of Metamaterials and Plasmonics for addressing the challenges and demands of the modern world. The conference follows two previous events META'08 in Marrakesh – Morocco and META'10 in Cairo – Egypt.

The true multidisciplinary flavor of metamaterials reflected in the diverse backgrounds and interests of the workshop participants. In addition to the mixture of scientific and engineering contents, the spectrum of participants' backgrounds ranged from theoreticians, computational and analytical modeling experts, experimentalists, application-oriented engineers, to administrators responsible for research funding.

## Organization

The general chair of the conference was Prof. Said Zouhdi from the University Paris-Sud (France). The co-chair was Prof. Xavier Begaud from Telecom ParisTech (France). The local organizing committee assisted in the practical arrangements in the conference site, Polytech Paris-Sud.

From the very beginning a web page (<http://meta12.metaconferences.org>) was available with all the relevant information concerning the conference. Moreover, a first call for papers was issued in April 2011 followed by a second call in October 2011.

The meeting was sponsored and supported by, IEEE, URSI, EOARD, USAITCA, ONRG, TELECOM PARISTECH, SUPELEC, GDR Ondes, IOP Publishing, EPL, CST, NEASPEC and OPTOPHASE.

## Technical Sessions

The conference featured 4 plenary lectures and 16 keynote lectures by world-renowned speakers. The readers can readily appreciate the diversity of topics covered and the high caliber of the presenters:

1. *The Two Conflicting Narratives of Metal-Optics*, Eli Yablonovitch, University of California, Berkeley, USA

2. *From Metamaterials to Metasystems to Metafunctions*, Nader Engheta, University of Pennsylvania, USA
3. *Applications of complex plasmonic structures in sensing and nonlinear optics*, Harald Giessen, University of Stuttgart, Germany
4. *Frontiers of Plasmonics: enabling new applications*, Naomi Halas, Rice University, USA
5. *Close encounters between nanoantennas: Bridging quantum and classical plasmonics*, Javier Aizpurua, Spanish Council for Scientific Research, Spain
6. *Controlling light propagation in plasmonic and metamaterial structures*, Yuri Kivshar, The Australian National University, Australia
7. *Plasmonic nanocavities: Validity of the classical description and non-local effects on the nm-scale, and new applications as plasmonic sinks*, Stefan Maier, Imperial College London, UK
8. *Spectral super-resolution in metamaterial composites*, Graeme Milton, University of Utah, USA
9. *Recent Progress in Photonic Crystals - From Dynamic Control to Solar Cells -*, Susumu Noda, Kyoto University, Japan
10. *Quantum plasmonics and plexcitonics*, Peter Nordlander, Rice University, USA
11. *fJ/bit nanophotonics for photonic network on chip*, Masaya Notomi, NTT Basic Research Laboratories, Japan
12. *Inside the Wavelength: seeing really small objects with light*, John Pendry, Imperial College London, UK
13. *Negative Refraction and Light Bending with Plasmonic Nanoantennas*, Vladimir Shalaev, Purdue University, USA
14. *Boundary conditions for metasurfaces: idealization, materialization, realization*, Ari Sihvola, Aalto University, Finland
15. *Bringing gain in Metamaterials*, Costas M. Soukoulis, Ames Lab, Iowa State University, USA and IESL-FORTH, Heraklion, Greece
16. *From nano bumps to vertical U-shape three-dimensional gold nano-ring and toroidal metamaterials in optical region*, Din Ping Tsai, National Taiwan University, Taiwan
17. *Metamaterials for Defense Applications*, Augustine Urbas, Air Force Research Laboratory, USA
18. *Recent Progress on Optical Metamaterials and Transformation Optics*, Martin Wegener, Karlsruher Institut für Technologie, Germany
19. *Exotic plasmonic crystals for nanophotonic applications*, Anatoly Zayats, King's College London, UK

20. *From Metamaterials to Metadevices*, Nikolay Zheludev, University of Southampton, UK

Other invited papers, oral and poster contributed papers were distributed among the 84 different sessions of the conference.

These sessions practically covered all modern aspects of metamaterials and plasmonic materials such as:

- bottom-up manufacturing methods
- plasmonics structures and antennas for biomedical applications
- negative group delay (NGD) concept and applications
- active and quantum metamaterials
- mid-infrared and THz plasmonics
- acoustic metamaterials
- light absorptions or photothermal effects in the field of plasmonics and metamaterials
- energy transportation in metamaterials

The event attracted top international researchers as well as their younger peers to strengthen connections among specialists in the area of Metamaterials, plasmonics and PCs research. In addition to the mix of scientists and engineers, participants included theoreticians, computational and analytical modelling experts, experimentalists, application-oriented engineers.

The full-version of the conference papers will be reviewed to be included in special issues of the journals **Applied Physics A** (*Springer*) and **Advanced Electromagnetics**.

The conference participants were also offered diverse cultural programs arranged by the organizing committee.

## Summary

In summary, META'12, the 3rd International Conference on Metamaterials, Photonic crystals and Plasmonics was an outstanding and very informative conference, with broad coverage of diverse activities in Metamaterials, plasmonics and PCs science and engineering developments by international researchers. The organizers and local hosts were extremely dedicated in arranging a well-organized and memorable conference.

## Key figures

- 566 accepted papers
- 545 participants
- 46 countries
- 84 sessions
- 4 exhibiting companies